

1. *Chlorophyll a* (Chl *a*) is the primary photosynthetic pigment in most plants and algae. It is a green pigment that absorbs light energy in the blue and red regions of the visible spectrum. Chl *a* is essential for the light-dependent reactions of photosynthesis, where it converts light energy into chemical energy.

2. *Chlorophyll b* (Chl *b*) is an accessory pigment found in green plants and algae. It absorbs light energy in the blue and orange-red regions of the visible spectrum. Chl *b* transfers the absorbed energy to Chl *a* for use in photosynthesis.

3. *Carotenoids* are a group of pigments that include carotenes and xanthophylls. They absorb light energy in the blue and green regions of the visible spectrum. Carotenoids act as accessory pigments, transferring energy to Chl *a*. They also play a role in protecting the photosynthetic apparatus from damage by excess light energy.

4. *Xanthophylls* are a subclass of carotenoids that include pigments like lutein and zeaxanthin. They absorb light energy in the blue and green regions of the visible spectrum. Xanthophylls are involved in the xanthophyll cycle, which helps regulate the light-harvesting capacity of the photosynthetic apparatus under varying light conditions.

5. *Anthocyanins* are water-soluble pigments that give plants red, purple, and blue colors. They are not directly involved in photosynthesis but can play a role in protecting plants from environmental stressors like UV radiation and herbivory.

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